

REMARKS

In the latest Office Action, claims 9-12 and 14 stand rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement and the enablement requirement. The Examiner has asserted that the previously added claim limitation "has reduced sputtered metal contaminants in comparison with a layer of silicon dioxide doped with ions deposited by a Kauffman ion implantation process" is not sufficiently supported by the originally filed application.

Applicant disagrees. It is clear from the specification that the claimed method results in reduced sputtered metal contaminants over the Kauffman method because the claimed method does not use a device which uses a metal grid such as that employed in the Kauffman technique. See the specification at page 10, lines 6-13, which states that "plasma source ion implantation reduces the possibility of contamination of the target object by eliminating a device which employs a metal grid."

Further, as previously pointed out, the Board concluded in the Decision on Appeal decided December 12, 2007 that the specification describes a process that reduces the possibility of contamination when compared to the prior art Kauffman ion source implantation technique. See the Board's statement at pages 14-15 of the decision that the specification describes a semiconductor device made by "a process that *reduces* the possibility of contamination when compared to the prior art Kaufman ion source implantation technique." Thus, the Board supports Applicant's position that the claims, as amended, find proper support in the specification as originally filed.

Claims 9-12 and 14 stand rejected under 35 U.S.C. 112, second paragraph, as being indefinite. The Examiner asserts that the limitation "has reduced sputtered metal contaminants..." renders the claim indefinite as "the ordinary artisan would not know what level of metal contaminants is required to meet the limitation." The Examiner further asserts that whether or not the metal contaminants are "sputtered" metal contaminants "makes no difference in the product," and that there is no way to

determine if metal contaminants in the final product came from a Kauffman ion implantation process or another source. Applicant disagrees with the Examiner's reasoning. The claim is merely stating that the process as claimed produces a layer of silicon dioxide having reduced, i.e., fewer, metal contaminants than if the layer were produced in a Kauffman ion implantation technique. There is no need to quantify or to determine the amount of metal contaminants as the claim clearly conveys that the claimed process produces fewer metal contaminants than a process utilizing the Kauffman ion implantation technique.

The Examiner further states at page 4 of the Office Action that it is unclear if Applicant is positively reciting a layer of silicon dioxide doped with ions deposited by a Kauffman ion implantation process. Again, applicant submits that the claim is clear--one layer of silicon dioxide is positively recited, which layer has reduced sputter metal contaminants in comparison with the (same) layer if it were doped with ions deposited by a Kauffman ion implantation process.

With regard to claim 14, the Examiner further asserts that the limitation "a semiconductor substrate formed from a material selected from the group consisting of silicon dioxide, quartz and glass" renders the claim indefinite, asserting that it is unclear how the substrate can be a semiconductor substrate when it is made of an insulating material. Applicant wishes to point out that such materials are commonly used as semiconductor substrates. As described and explained in the specification at page 7, lines 18-27, such materials are commonly used to form the substrate on which a semiconductor device is fabricated. Further, the recited materials find clear support in the specification as originally filed (see page 6, lines 5-6 and page 7, lines 25-27).

Accordingly, Applicant submits that claims 9-12 and 14 are in compliance with §112, first and second paragraphs.

Claim 9 is rejected under 35 U.S.C. 102(a) as being anticipated by Applicant's admitted prior art (APA). The Examiner acknowledges that the APA does not explicitly

state that the layer of silicon dioxide "has reduced sputtered metal contaminants in comparison with a layer of silicon dioxide doped with ions deposited by a Kauffman ion implantation process," but asserts that "this limitation is inherent." The Examiner asserts that the "level of metal contaminants imparted by the Kauffman ion implantation process of the APA can be considered 'reduced' compared to an arbitrary ion implantation process conducted at a higher energy and/or for a longer time." However, claim 9 does not refer to an "arbitrary" implantation process, but rather refers specifically to the comparison of a silicon dioxide layer deposited with ions by a plasma ion source implantation process with that of the (same) silicon dioxide layer deposited with ions by a Kauffman ion implantation process. Hence the claimed comparison cannot be inherent in the APA. The Examiner's reasoning is faulty. The APA is a Kauffman ion implantation process. That process cannot result in reduced sputtered metal contaminants in comparison to itself.

Claims 9 and 10 are rejected under 35 U.S.C. 102(b) as being anticipated by Zhang et al. (US 5,946,585) as evidenced by Nakanishi et al. (US 6,265,247). The Examiner has chosen to ignore the limitation "having been doped with hydrogen ions deposited by a plasma source ion implantation process," asserting that this is a product-by-process limitation which does not structurally distinguish the claimed invention over the prior art. Applicant disagrees. The method by which the layer has been formed directly affects the composition of the final product, e.g., with regard to the amount of metal contaminants in the silicon dioxide layer. A silicon dioxide layer with no or a reduced amount of metal contaminants is compositionally different than a silicon dioxide layer with greater levels of metal contamination.

The Examiner has further concluded that "since no Kauffman ion implantation process is conducted during the manufacturing of the device of Zhang, it is inherent that the oxide layer has reduced sputtered metal contaminants in comparison with a silicon dioxide doped with ions deposited by a Kauffman ion implantation process." Again, the

Examiner's logic is flawed. There is no teaching or suggestion in either Zhang et al. or Nakanishi et al. of doping a layer of silicon dioxide with hydrogen ions deposited by a plasma source implantation process. Zhang et al. merely teach formation of a silicon oxide or silicon nitride film by plasma CVD. The Examiner has concluded that such a layer would inherently contain some hydrogen; however, this conclusion is based on speculation, not facts or evidence. The references are silent, and silence cannot provide the required factual basis for anticipation. Further, there is absolutely no teaching or evidence that if hydrogen ions existed in the layer of Zhang, such ions would be located in the surface of such a layer as claimed.

With regard to Nakanishi et al., the Examiner refers to column 2, lines 30-34, which teaches that the hydrogen ion concentration of silicon *nitride* films formed by plasma CVD is higher than the hydrogen ion concentration of silicon *oxide* films formed by the same plasma CVD method. From this teaching, one skilled in the art would not conclude that Nakanishi et al. teach the claimed process in which a layer of silicon dioxide is doped with hydrogen ions formed by a plasma source ion implantation process, nor would one conclude from reading Nakanishi et al. that the claimed process results in reduced sputtered metal contaminants when compared with a layer of silicon dioxide doped with hydrogen ions deposited by a Kauffman ion implantation process.

Claim 14 is rejected under 35 U.S.C. 102(b) as being anticipated by Shufflebotham (US 5,711,998). The Examiner has again chosen to ignore the limitation "having been doped with hydrogen ions deposited by a plasma source ion implantation process" and has concluded that substrate 301 of Shufflebotham inherently has reduced sputtered metal contaminants in comparison with a substrate doped with ions deposited by a Kauffman ion implantation process. Applicants submit that claim 14 is patentable over Shufflebotham for the same reasons discussed above.

Claims 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Burns et al. (*Principles of Electronic Circuits*) in view of the APA. The Examiner

acknowledges that Burns et al. do not teach the claimed layer of silicon dioxide having hydrogen ions implanted therein having reduced sputtered metal contaminants in comparison with a layer of silicon dioxide doped with ions deposited by a Kauffman ion implantation technique, but asserts that this teaching is inherent in the APA. As pointed out above, the APA does not teach that a silicon dioxide layer deposited with ions by a plasma ion source implantation process compared with that of the (same) silicon dioxide layer deposited with ions by a Kauffman ion implantation process would have reduced metal contaminants.

Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Murata et al. (US 5,576,229) in view of the APA. The Examiner has again taken the position that the APA inherently teaches a silicon dioxide layer having reduced sputtered metal contaminants in comparison with a layer doped with ions by a Kauffman ion implantation process, and that it would have been obvious to combine Murata et al. with the APA. Applicant submits that claim 14 is patentable over the cited references for the same reasons discussed above.

For all of the above reasons, applicant submits that claims 9-11 and 14 are patentable over the cited art of record. Early notification of allowance is respectfully requested.

Respectfully submitted,

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